

# The Opportunity to Reduce Bridge Preservation Demands through Enhanced Quality Expansion Joint and Bearing Installation and Inspection

Ralph J. Dornsife P.E., S.E.  
Washington State Dept. of Transportation  
Bridge & Structures Office  
Olympia Washington USA



# Expansion Joint / Bearing Case Studies

- Armored Strip Seal (I-5 SB Blakeslee Junction)
- Armored Strip Seal (I-5 SB BNSF / Dike Road O/C)
- Preformed Silicone Seal (I-5 Capitol Lake O/C)
- Modular Expansion Joint (I-5 / SR 18 Triangle Project)
- Modular Expansion Joint (I-90 WB East Channel)

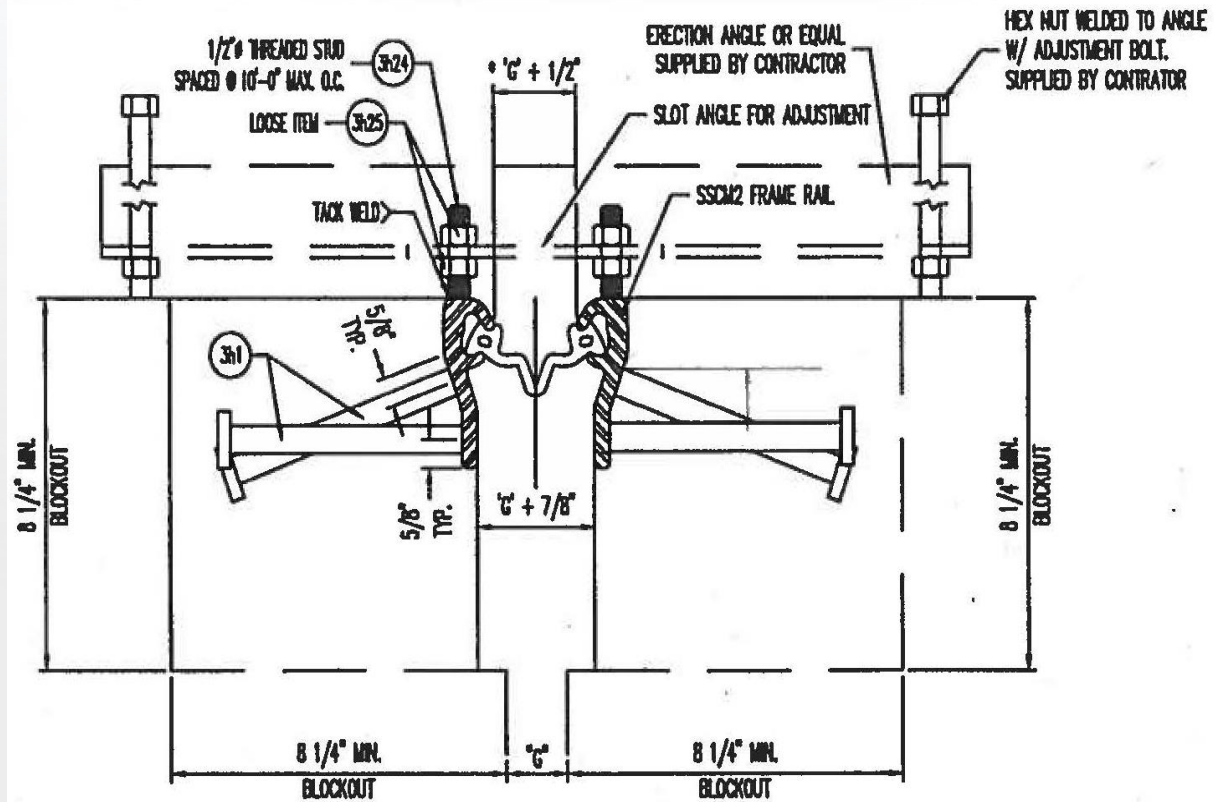
---

- Disk Bearing (Nalley Valley SW-Line)
- Elastomeric Bearing (SR 520 Floating Bridge Replacement)

# Armored Strip Seal Expansion Joint Failure (I-5 SB Blakeslee Junction Bridge)



# Support and Setting Details



# Installation Hardware



# Installation Hardware – Close-up



# Armored Strip Seal Anchorage Failure



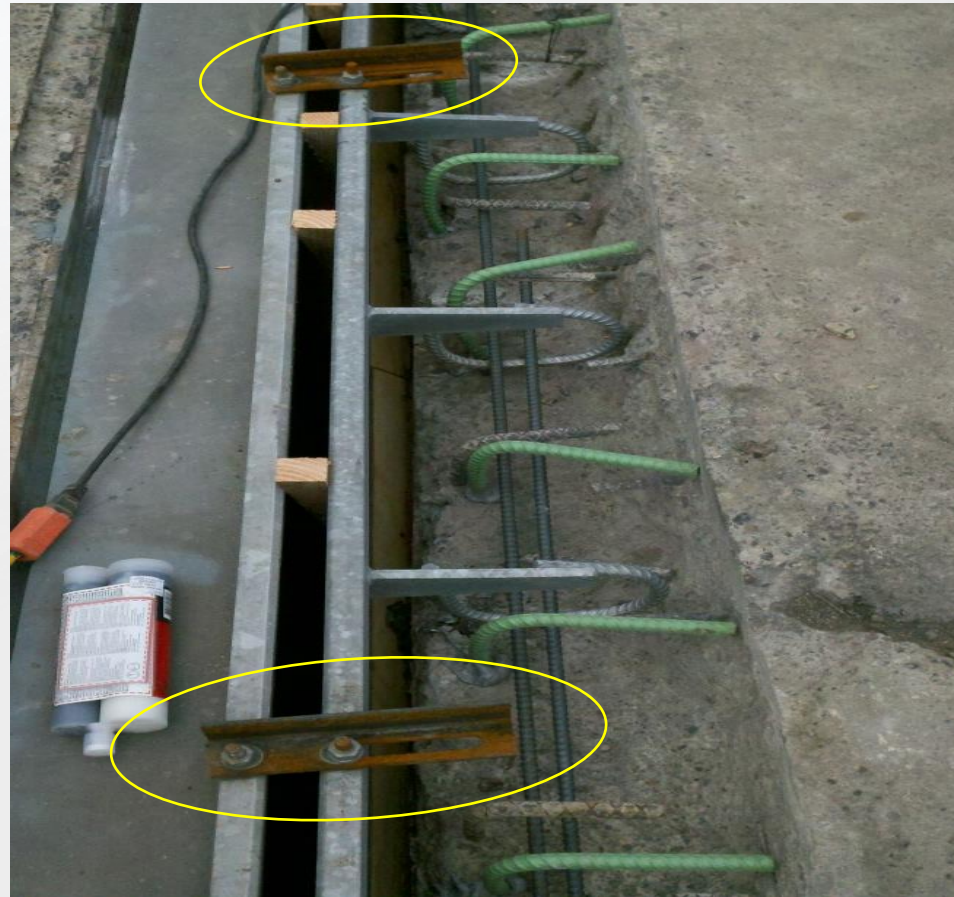
# Armored Strip Seal Expansion Joint Failure

## (I-5 BNSF / Dike Road O/C Bridge)





# Installation Hardware



# Detached Elastomeric Seal



NATIONAL BRIDGE PRESERVATION PARTNERSHIP CONFERENCE 2018

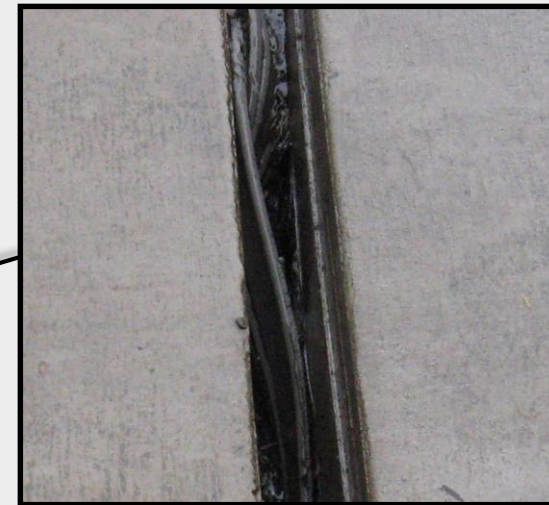
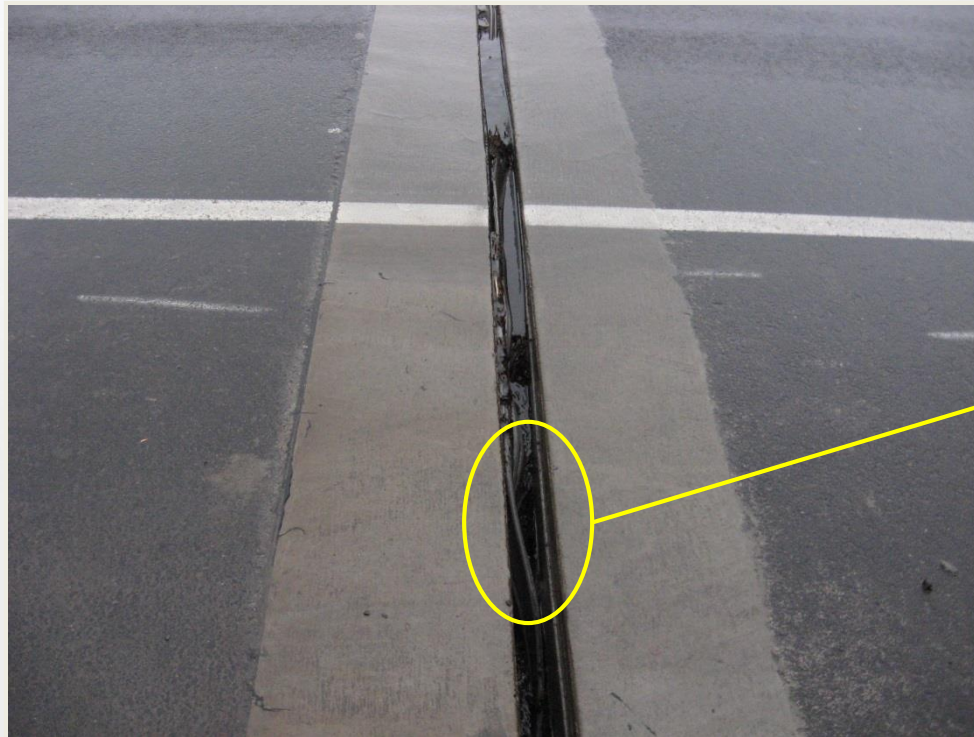
PRACTICES WE CAN NOT AFFORD TO DEFER

# Preformed Silicone Seal Joint Failure

## (I-5 Capitol Lake O/C Bridge)



# Preformed Silicone Seal Replacement and Failure



**Seal debonding**

# Unarmored Silicone Strip Seal Installation Deficiencies



# I-Modular Expansion Joint Failure (I-5 / SR 18 Triangle Project Ramp Bridge)



Pre-installation photo underneath modular expansion joint

# Modular Expansion Joint Repairs



NATIONAL BRIDGE PRESERVATION PARTNERSHIP CONFERENCE 2018

PRACTICES WE CAN NOT AFFORD TO DEFER

# Modular Expansion Joint Repairs



NATIONAL BRIDGE PRESERVATION PARTNERSHIP CONFERENCE 2018

PRACTICES WE CAN NOT AFFORD TO DEFER

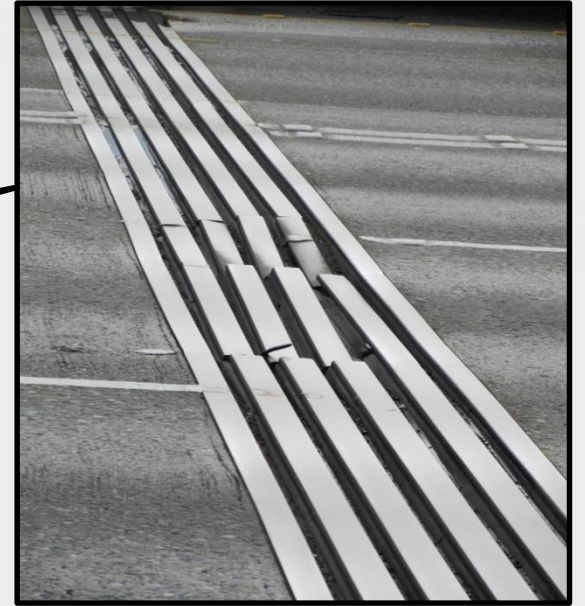


# Traffic Implications



# Modular Expansion Joint Handling Issues

## (I-90 WB East Channel Bridge)



# Modular Expansion Joint - Field Splice Location



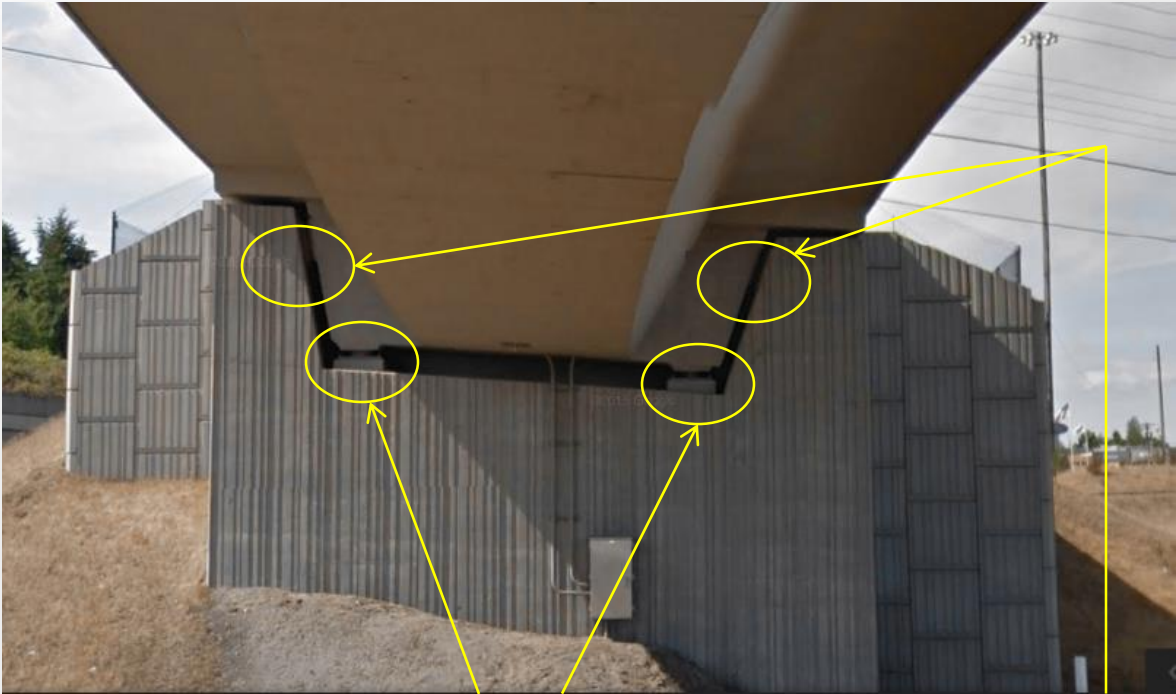
NATIONAL BRIDGE PRESERVATION PARTNERSHIP CONFERENCE 2018

PRACTICES WE CAN NOT AFFORD TO DEFER

# Damaged Stainless Steel Slide Plate



# Misoriented Disk Bearings (Nalley Valley SW-Line Bridge)



Sliding Disk Bearing

Transverse Stop Bearing

# Disk Bearing Installation



NATIONAL BRIDGE PRESERVATION PARTNERSHIP CONFERENCE 2018

PRACTICES WE CAN NOT AFFORD TO DEFER

# Mishandled Elastomeric Bearings

## (SR 520 Replacement Floating Bridge)



# Elastomeric Bearings Installation Damage





# Gouged Elastomer with Exposed Steel Shims



# Use of Installation Technician

- **Acknowledgment of Role**
- **Qualifications**
- **Present at all Critical Times**

# Role of the Inspector

- **Experience**
- **Specialized Training (Just-in-Time)**
- **Staff Retention**

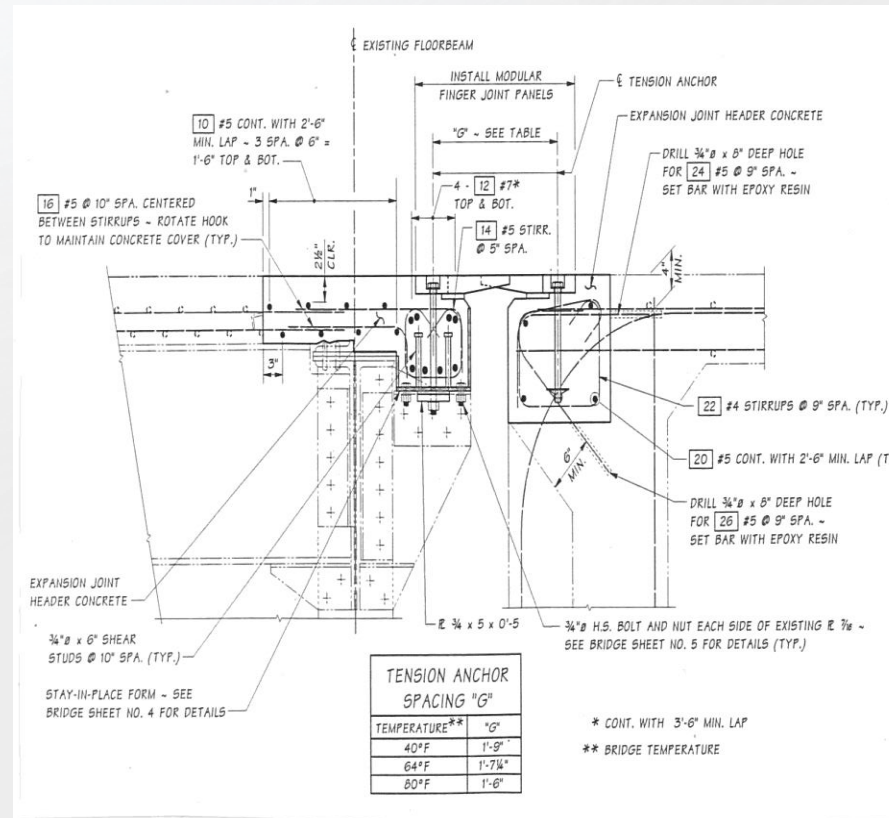
# Communication

- **Backgrounds**
- **Roles**
- **Coordinating**

# Installation Procedures

- **Documentation**
  - Shop Drawings
  - Written Procedures
- **Review & Approval**

# Modular Finger Joint System (I-5 North Fork Lewis River Bridge)



# Installed Finger Joint System



# Design Considerations

- **Inspection**
- **Maintenance**
- **Installation**



# Contact Information

- **Ralph J. Dornsife**
  - WSDOT Bridge & Structures  
P.O. Box 47340  
Olympia WA 98504-7340
  - 360-705-7199
  - [dornsir@wsdot.wa.gov](mailto:dornsir@wsdot.wa.gov)